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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/830,540	04/26/2001	Frank Kowalewski	1587	9344

7590 04/06/2006  
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EXAMINER

DEAN, RAYMOND S

ART UNIT PAPER NUMBER

2618

DATE MAILED: 04/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/830,540	<b>Applicant(s)</b> KOWALEWKI, FRANK	
	<b>Examiner</b> Raymond S. Dean	<b>Art Unit</b> 2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 05 January 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 29 - 45 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 31 - 36, 38, 39 - 45 is/are allowed.
- 6) ☒ Claim(s) 29 and 37 is/are rejected.
- 7) ☒ Claim(s) 30 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments, see Appeal Brief filed January 5, 2006 with respect to the rejection(s) of claim(s) 29 – 45 under 35 U.S.C. 103(a) and 102(e) have been fully considered and are persuasive. Examiner has reconsidered Applicant's arguments and has determined that said arguments are persuasive thus Examiner is reopening prosecution.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ramesh (US 6,205,127) in view of Antonio et al. (US 6,519,456).

Regarding Claim 29, Ramesh teaches a radio station comprising at least two antennas from which signals are propagated over respective radio channels to an additional radio station (Figures 5 – 7, Column 7 lines 32 – 40); a code generator for widening data transmitted with the signals with a respective code, said code generator ascertaining said respective code according to a selected radio link (Column 6 lines 20

– 26, Column 9 lines 40 – 44, the system can be a CDMA system, CDMA systems use PN codes for spreading ); and a modulator (Figure 6, modulator (611)).

Ramesh does not teach a modulator including means for pre-equalization of radio signals to be transmitted to form the pre-equalized signals; wherein said means for pre-equalization of said radio signals to be transmitted from said at least two antennas performs said pre-equalization according to all actually used codes and transmission properties of all actually used ones of said radio channels.

Antonio teaches a modulator including means for pre-equalization of radio signals to be transmitted to form the pre-equalized signals (Figure 5, Figure 6, Column 12 lines 13 – 17, the modulator (114) comprises an IIR filter for pre-equalization); wherein said means for pre-equalization of said radio signals to be transmitted from an antenna performs said pre-equalization according to all actually used codes and transmission properties of all actually used ones of said radio channels (Column 12 lines 13 – 17, the IIR filters used for pre-equalization in a wireless RF system take into account the properties of at least one RF channel, which can be a channel that is actually used for communication, the actual code used, along with the information being transmitted, modulates the RF carrier thereby directly setting the RF bandwidth thus said code is also a part of the channel properties, the IIR filters will thus take into account the transmission properties of at least one radio channel that is actually used and the code used setting the bandwidth).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the modulator of Ramesh with the modulation circuitry of

Antonio for the purposes of providing an additional means of mitigating multipath fading and interference thereby increasing the probability that a radio receiver will be able to receive a signal with satisfactory quality.

4. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lo (US 6,826,236) in view of Rasky et al. (5,265,122).

Regarding Claim 37, Lo teaches a radio station comprising at least two antennas for receiving and transmitting radio signals transmitted over corresponding radio channels from another radio station (Figure 1, Column 1 lines 29 – 34, lines 49 – 52, lines 60 – 66, typical antennas have reciprocity thus the transmitting antennas can also receive signals); means for transmitting respective weighted reference signals to said another radio station from said at least two antennas over said corresponding radio channels (Column 1 lines 60 – 66, Column 2 lines 34 – 47, the signals that are transmitted comprise symbols which pertain or refer to information thus said signals are reference signals), wherein said respective weighted reference signals are formed by multiplying respective reference signals by corresponding coefficients assigned to said at least two antennas (Column 1 lines 60 – 66, Column 2: lines 34 – 47, lines 56 – 65, Column 3 lines 1 – 10), and so that said respective weighted signals are transmitted from corresponding antennas associated with said respective coefficients (Column 1 lines 60 – 66, Column 2: lines 34 – 47, lines 56 – 65, Column 3 lines 1 – 10).

Lo does not teach means for multiplying respective received signals from said at least two antennas with corresponding coefficients (c1, c2) to form weighted received

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signals; means for adding said weighted received signals to form a resulting linear combination; means for selecting said corresponding coefficients (c1, c2) and means for inputting said resulting linear combination to a demodulator.

Rasky teaches means for multiplying respective received signals from said at least two antennas with corresponding coefficients (c1, c2) to form weighted received signals (Figure 6, Column 8 lines 32 – 47); means for adding said weighted received signals to form a resulting linear combination (Figure 6, Column 8 lines 32 – 47); means for selecting said corresponding coefficients (c1, c2) and means for inputting said resulting linear combination to a demodulator (Figure 6, Column 8 lines 32 – 47).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the radio station of Lo with the circuitry taught above by Rasky for the purpose of taking advantage of the performance gains provided by diversity combining as taught by Rasky.

### ***Allowable Subject Matter***

5. Claim 30 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding Claim 30, Antonio further teaches at least one channel estimator (11,12) and wherein said at least one channel estimator comprises means for

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determining an estimate of an impulse response of each of a plurality of radio channels and said pre-equalization of said radio signals occurs according to said estimate of the impulse response of the radio channel that said radio signal is transmitted on (See Column 10 lines 27 – 30, Column 12 lines 13 – 17, since the IIR estimates the channel impulse response there is an inherent channel estimator, since the modulator can process multiple CDMA channels, the components that make up said modulator, such as the IIR, can process multiple CDMA channels, the IIR can determine the impulse response for each channel and pre-equalize a signal that is to be transmitted on a particular channel according to the impulse response of said particular channel). The prior art of record, however, fails to teach or show **said pre-equalization occurring according to the estimate of the impulse response for each of the radio channels.**

6. Claims 31 – 36 and 38 – 45 are allowed.

The following is an examiner's statement of reasons for allowance:

Regarding Claims 31, 38, Ramesh in view of Antonio, as set forth above, teach a method for transmitting signals between a first radio station (1) and a second radio station (2), said first radio station including a modulator (4) with pre-equalization means, said method comprising the steps of: performing a pre-equalization of radio signals to be transmitted in said modulator of said first radio station in order to form pre-equalized signals; transmitting said pre-equalized signals from the first radio station over each of a plurality of radio channels (20,25) to the second radio station (2); receiving said pre-equalized signals transmitted over each of said radio channels (20,25) in the second

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radio station, said pre-equalized signals transmitted over respective channels being received in said second radio station by a corresponding antenna of said second radio station (2). Lo and Rasky show, as set forth above, a radio station having a plurality of antennas. The prior art, however, fails to teach or show **determining an estimate of a total impulse response of all of said radio channels (20,25) in said first radio station (1) or from respective reference signals received over said radio channels from said second radio station; wherein said pre-equalization of said radio signals is performed by said modulator (4) according to said estimate of said total impulse response determined.** Claims 32 – 36 directly or indirectly depend on Claim 31 therefore examiner gives same reason as set forth above.

Regarding Claim 39, Ramesh in view of Antonio teaches, as set forth above, steps a – c. Ramesh in view of Antonio also teaches, as set forth above, a CDMA system where there is a plurality of radio stations. These radio stations will transmit data, which is widened by the PN codes used in CDMA, over additional channels. The prior art of record, however, fails to teach or show **wherein said pre-equalization in said modulator (4) of said radio station is performed according to all of said different codes and according to transmission properties of all of said radio channels and said additional channels.** Claims 40 – 45 directly or indirectly depend on Claim 39 therefore examiner gives same reason as set forth above.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably



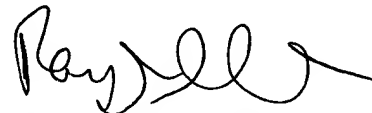
accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### **Conclusion**

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond S. Dean whose telephone number is 571-272-7877. The examiner can normally be reached on Monday-Friday 6:00-2:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward F. Urban can be reached on 571-272-7899. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). PLEASE NOTE: Art Unit 2684 is now Division 2618.



Raymond S. Dean  
March 24, 2006



EDWARD F. URBAN  
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